

The Dilemma with Ginkgo

Stanton Gill, Extension Specialist in IPM and Entomology University of Maryland
Extension, CMREC

And Professor in Landscape Technology, Germantown Campus of Montgomery
College

Ginkgo trees are a hot item in the Maryland nursery and landscape trade. With the green and white ash being taken out by Emerald Ash borer people have looked for a more disease and insect resistant tree. What could be better than a ginkgo tree? It is fairly resistant to both disease and insect. At least so far, few problem with this species of tree.

I must say I have an affinity for this tree. It survived from ancient times and persevered through many climate changes, ice ages and asteroids hitting the earth - one tough tree. Great foliage and wonderful fall color. My cheerleading for this tree could not be more enthusiastic.

That said, an interesting case came my way. I had a call from a community that had a landscaper install male ginkgo plants. The trees had been installed 6 or 7 years ago as replacements for green ash trees. It had been suggested that ginkgo was good substitute for the emerald ash borer prone ash trees. A couple of the trees planted in the community were obviously females and were producing fruit. The neighborhood was not happy since the dropping fruit smelled awful. The landscapers went back to the nursery supplier who said he bought liners labeled as male ginkgo trees.

In the nursery business the plant propagators generally bud or graft scion wood from a male ginkgo onto a young understock, which can be either a male or female tree. When it is sold onto an in-ground nursery the grafted plant is lined out in the field for 3 -7 years. I talked to one nursery owner who told me sometimes the scion wood fails and the

understock puts up several shoots from the root system. Most nursery managers will select out the strongest shoot from the root system. He had noticed the stronger shoots tended to end up as female tree. He felt female ginkgo trees had more vigor compared to a male tree. Unfortunately, females trees also produce beautiful apricot shaped fruit that smell awful when they drop to the ground.

An online article was forwarded to me in which the author claimed that a female ginkgo understock that had a male grafted onto it could cause the male scion to switch to a female fruit producing tree. I asked Richard Olsen and Keith Warren to comment on this male converting to female.

Richard Olsen, Director of the US National Arboretum, had these comments:

Wish I could be of more help. I have not heard of this before with grafted Ginkgo's, but doesn't mean not possible...here's what I have seen.

I have seen on mature male ginkgos, witch's brooms that are female and producing fruit. As if the genetic switch that induced the broom is also inducing a switch in floral expression (or is that strobili in a gymnosperm?). I have personally seen this on two trees, one in Missouri, and another in Kentucky. And considering the genes are present to be male or female, all it would take is a change in a gene regulation to switch sexes.

Now, can the sex of a rootstock affect the sex of the scion? I haven't scanned the literature to see if there are examples in angiosperms, where sex of the rootstock reverses the sex of the scion. Maybe in some tree fruit crops this has been studied (Avocado? Persimmon?). We do know now that "florigen" exists as genetic signal in the plant that is phloem mobile. So feasible the roots could affect sex this way...

Considering that most rootstock is going to be juvenile, due to age and position, and that in Ginkgo they take years to sexually mature, I don't see how on a young grafted plants there would be any affect. I assume that perhaps someone is concerned about a female rootstock causing all scions grafted to it to be female? Since we don't know the sex of the rootstock, that's a big leap. Also, sounds like a good undergraduate or MS project. Asexually propagating male and female ginkgos and then reciprocal grafting to see the effect on sexual expression!

Keith Warren, JF Schmidt & Son Co., had these comments:

Sex expression in dioecious trees is both interesting and puzzling. In many species it is not 100% static and binary. Complicating the issue are real world mistakes that occasionally happen in propagation. Many dioecious trees contain a percentage of bisexual trees in their populations, so the botanists call these polygamo-dioecious, and we plant breeders call them frustrating! Just when you think you have a great new male clone, it throws some seed. It's happened to me more than once.

I have also personally cleaned up mixed up clones, where a nursery had confused trees and produced female trees by mistake. In one instance, this was a Ginkgo produced by an east coast nursery with a wonderful reputation.

Ginkgo clones are particularly hard to sort out visually, so mistakes happen. Occasional "non-takes" can slip through production when a seedling looks so much like the intended cultivar that it is not noticed. Sometimes a clone has been male for years, then with age becomes bisexual.

I certainly can't tell you the answer in this specific instance, but I can think of a number of possibilities.

I doubt the sex of the understock has an influence. In some species, we see certain cultivars are firmly fixed as male with no variation,

despite being grafted on seedling understock. And some cutting produced trees are firmly polygamo-dioecious despite being on their own genetic roots.

I think it is very fair to say that science doesn't fully understand sex expression in dioecious trees. The understock theory is perhaps plausible, but unless there has been research to back it up, I would just call it an interesting but unlikely theory.

You'll be able to tell if the ginkgo is male or female by looking at the buds and leaves as they first start opening in spring.



Ginkgo is technically similar to a conifer, and the male part looks like a tiny cone right off the bat. Females send up slender green shoots along with the new leaves. They eventually produce rounded pods that look like fruits but are actually seeds.